

On some species of Japanese Marine Shells and Fishes, which inhabit also the North Atlantic. By J. GWYN JEFFREYS, LL.D., F.R.S., F.L.S.

[Read January 15, 1874.]

DURING the survey made by Capt. St. John in H.M.S. 'Sylvia' of the coasts of Japan between $43^{\circ} 34'$ and $33^{\circ} 23'$ N. lat., and $145^{\circ} 20'$ and $131^{\circ} 40'$ E. long., in the years 1871 and 1872, the dredge was occasionally used; and the results have been kindly placed at my disposal by Capt. St. John and the Hydrographer Royal. All the specimens of natural history, except those shells which I now propose to notice, have been placed in the British Museum.

Our present knowledge of the geographical distribution of the marine Mollusca is so imperfect that any contribution to the subject cannot but have its value. The accuracy of Capt. St. John's hydrographic surveys is universally recognized; and I will endeavour to be equally careful in determining and naming the Japanese shells, which, on comparison with those from European seas, I regard as belonging to the same species. I am quite aware of the difference of opinion entertained by many experienced conchologists as to the identity of species which inhabit widely separated tracts of the ocean, and that such species are called by some conchologists "representative" instead of identical; but certain species (e. g. *Saxicava rugosa* or *arctica*) unquestionably have a world-wide distribution. Moreover the love or ambition of species-making is perhaps inherent in the nature of many naturalists, however conscientious they may be. For myself I would renew my expression of unqualified approval of the opinion entertained by the learned authors of the 'Flora Indica,' that the discovery of a form uniting two others previously thought to be distinct, is much more important than that of a totally new species, inasmuch as the correction of an error is a greater boon to science than is a step in advance. The variation of species among the Mollusca cannot be less than among plants.

The marine shells of Japan have been noticed and described by several writers, from Carl Peter Thunberg in 1788 to Dr. C. E. Lischke in 1872. This last excellent conchologist gave, in the first volume of his 'Mollusca Japonica,' a valuable synoptical table of those species which inhabit other parts of the world. He showed that the following species are common to Japan and

the Mediterranean—*Triton olearium* (properly *olearius*), Linné, *Saxicava arctica*, L. (*S. rugosa*, var.), and *Lima squamosa*, Lamarck; and common to Japan and the Atlantic coast of Europe, *Triton olearium*, *Saxicava arctica*, *Mya arenaria*, L., and *Modiola* (*Mytilus*) *modiolus*, L. In his second volume he noticed *Lasæa rubra*, Montagu, which inhabits also the Mediterranean and the Atlantic coast of Europe. We have thus five species in the same category. Three of these species (viz. *Mytilus modiolus*, *Lasæa rubra* and *Mya arenaria*) are inhabitants of the shore and shallow water; *Saxicava rugosa* has a wide range of depth from low-water mark to 1230 fathoms; and *Lima squamosa* occurs in the coralline zone. All the five species are Atlantic. I now propose to record from Capt. St. John's dredgings thirty-nine species as common to Japan and the North Atlantic. These are exclusive of *Lima squamosa* and *Triton olearius*, which have been already noticed by Dr. Lischke; and the number may be increased by adding three species of Brachiopods (*Terebratula vitrea*, Gmelin, var. *minor*, *T. caput-serpentis*, L., and *Terebratella Spitzbergensis*, Davidson) mentioned by Mr. Davidson in the Proceedings of the Zoological Society of London for 1871; three species of other Mollusca (*Gemma gemma*, Totten, *Coralliophya lithophagella*, Lam., and *Piliscus commodus*, Middendorff) mentioned by Mr. Arthur Adams in the Proceedings of the same Society for 1863; *Limopsis abyssicola*, A. Adams, P. Z. S, 1869, *Fossarus Japonicus*, A. Adams = *F. costatus*, Brocchi.; besides *Limopsis aurita*, two species of *Pecchiolia* (*P. acute-costata*, Philippi, and *P. granulata*, Seguenza), *Pyramidella nitidula*, A. Adams, and other species which were dredged by me in the Bay of Biscay during the 'Porcupine' expedition of 1870, as well as by Mr. A. Adams in the Japanese seas.

In giving the geographical distribution for the species now about to be enumerated, I have added the range of depth for such of them as I procured in the 'Porcupine' Explorations of 1869 and 1870. This information will, I believe, be found useful.

It will be observed that some of the species are littoral or inhabit shallow water, while others inhabit the coralline and deep-water zones. The modes of migration or transport from the North Pacific to the North Atlantic, or *vice versâ*, must consequently be of different kinds. Some marine currents and tides are superficial; others are deep and sweep the bottom of the sea. Now the latter kind of currents seem to be almost unknown.

The stream and drift currents of the Atlantic and Pacific Oceans, with the surface temperature, are, indeed, most carefully laid down in the 'Pilot Charts' which have been lately published by our Admiralty under the superintendence of its eminent Hydrographer; but the direction and force of the abyssal currents ought to be fully investigated before we can explain the distribution of deep-water Mollusca, especially of the bivalves and such of the univalves as cannot swim, and whose fry do not rise to the surface and become for a short time oceanic. Voluntary migration seems to have little, if any, share in the work of diffusion. It is to be hoped that the present expedition of H.M.S. 'Challenger' will contribute much information on this very important and interesting subject, in the same way that to a limited extent was done in the 'Porcupine' expeditions. It is difficult to account for the occurrence of so many of the same species in the seas of Japan and the North Atlantic Ocean. Probably those species which inhabit deep water may have had a common origin or birthplace in high northern latitudes, and have found their way to Japan on the one side and Europe on the other by means of a bifurcation of the great Arctic current. Their entry into the Mediterranean from the Atlantic may have taken place through a wide channel which formerly existed between the lower part of the Bay of Biscay and the Gulf of Lyons, and which has been satisfactorily shown on geological grounds to have been made since the Tertiary epoch. The present communication through the Straits of Gibraltar seems to be also of a comparatively modern date.

With respect to the fishes which are common to Japan and the Mediterranean or the North Atlantic, I have been favoured by Dr. Albert Günther, F.R.S., with a list and note, which, with the permission of the Society, I will append to this paper. His authority as an ichthyologist is so great that his communication will be valuable on its own account, as well as in showing the distribution of the species not only among the invertebrates but also in the vertebrate fauna in the northern divisions of the Atlantic and Pacific Oceans.

Subkingdom MOLLUSCA.

BRACHIOPODA.

RHYNCHONELLA PSITTACEA, *Gmelin*; young.

35 fathoms. Lat. 41° 41' N.; long. 141° 0' E. Circumpolar.

CONCHIFERA.

LIMA ELLIPTICA, *Jeffreys*.

6 fathoms. Lat. $34^{\circ} 23'$ N.; long. $136^{\circ} 55'$ E.

The specimens (three in number) are much smaller than those from Skye; but the characters peculiar to this species, and which distinguish it from *L. auriculata*, are the same, viz. shape, sculpture, and obliquity of the central furrow. In the Japanese specimens the upper part of the anterior and posterior margins is sinuous, while in European specimens this part is flexuous. I do not regard this slight difference as a specific character.

North-east Atlantic and Mediterranean 'Porcupine' expeditions, 45-690 fathoms.

MYTILUS EDULIS, *Linné*, var. UNGULATA.

Endermo. The largest specimen measures 5 inches by $2\frac{1}{4}$.

Var. GALLOPROVINCIALIS.

Yokooka Dock, Gulf of Yedo; North Atlantic and Mediterranean.

MODIOLARIA MARMORATA, *Forbes*.

Three specimens.

Yokooka Dock.

Smaller than European specimens and darker-coloured.

North-east Atlantic and Mediterranean; Arabian and Persian Gulfs (*McAndrew*)! 'Porc.' exp. 165 fathoms.

MODIOLARIA DISCORS, *L.*; var. SUBSTRIATA, *Gray*.

One specimen, $1\frac{1}{2}$ inch long by 1 inch wide.

11 fathoms. E. Yeso.

North-east Atlantic and Mediterranean.

CRENELLA FABIA, *Fabricius*.

48 fathoms. Three specimens, one of which is $\frac{3}{4}$ of an inch long.

More finely striated than usual, but evidently this species.

Circumpolar.

NUCULA TENUIS, *Montagu*.

Numerous specimens.

3 to 48 fathoms.

North Atlantic and Mediterranean. 'Porc.' exp. 20-1630 fathoms.

LEDA LANCEOLATA, *James Sowerby*.

= *Nucula arctica*, *Broderip* & *G. B. Sowerby* (not of *Gray* or *Sars*, the

latter being *Nucula lanceolata* of Lamarck=*N. limatula*, Say,=
Yoldia hyperborea, Lovén).

= *N. oblonga*, G. B. Sowerby.

= *Yoldia arctica*, Möller.

Several specimens of different ages.

From 3 to 48 fathoms.

The sculpture is very variable. In some specimens the striæ are at first transverse and close-set, and afterwards become oblique and distant; in others the striæ are confined to the anterior side of the shell, as in *L. semistriata* of Mr. S. Wood, while in others the striæ are almost entirely absent. In the description of *Nucula lanceolata* by James Sowerby the shell is described as "smooth." Perhaps he intended the Crag shell referred by Mr. Wood to *Leda myalis* of Couthouy, but which does not appear to be that species.

Circumpolar.

LEDA FRIGIDA, *Torell*.

= *L. nana*, Sars.

Several specimens.

3 to 48 fathoms.

Also Spitzbergen, Norway, and southwards to the coast of Portugal, 50-1380 fathoms. Fossil at Messina, in the Zanclean division of the Pliocene formation (*Sequenza*)!

LEDA MINUTA, *Müller*.

Two specimens. Ooshima, and 48 fathoms. Agreeing in the most minute particulars with specimens dredged by me in St. Magnus Bay, Shetland.

North Atlantic. 'Porc.' exp.: W. coast of Ireland, 164-420 fathoms; Bay of Biscay, 305-717 fathoms.

CARDIUM GRÆNLANDICUM, *Chemnitz*.

Several young specimens from 48 fathoms.

Spitzbergen (*Torell*); United States (*Gould and others*); Behring's Strait (*Stimpson*). Circumpolar.

CARDIUM ISLANDICUM, *Ch.*

Several young specimens from 3-48 fathoms.

United States (*Gould and others*); Wellington Channel (*Belcher*). Circumpolar.

CARDITA BOREALIS, *Conrad*.

Endermo Harbour, 4-7 fathoms.

Undistinguishable from Crag specimens of *C. orbiculata*, S.

Wood; while certain specimens of *C. borealis* from Canada and the United States equally approach *C. analis* from Bridlington and *C. scalaris* from the Crag. Our Crag species are deplorably multiplied.

VENUS FLUCTUOSA, Gould.

Rather common in from 3 to 48 fathoms.

Spitzbergen (*Torell*). Circumpolar.

Varies in colour from olive-green to yellowish-white.

TAPES DECUSSATUS, L.

Common in 4-35 fathoms. A trapeziform variety occurs from Hakodadi. Japanese as well as European specimens differ among themselves in shape and sculpture; and it is impossible to separate the so-called *T. indicus* from *T. decussatus* by any other than a geographical character.

North-east Atlantic and Mediterranean.

TELLINA INFLATA, Stimpson.

Four specimens from 5-48 fathoms.

United States (*Stimpson*); Gulf of St. Lawrence (*Whiteaves*); Spitzbergen (*Torell*); Wellington Channel (*Belcher*).

LYONSIA HYALINA, Conrad.

Two specimens from 5 fathoms.

United States (*Conrad and others*).

Allied to *L. Norvegica*. Both species are very distinct from *L. arenosa*, which is circumpolar.

SAXICAVA RUGOSA, L.; var. *ARCTICA*.

7 fathoms; var. *præcisa*, Yokooka Harbour. Ubiquitous. Porc.' exp. 20-1230 fathoms.

MYA ARENARIA, L.

5-48 fathoms.

North Atlantic.

GASTROPODA.

TECTURA TESTUDINALIS, Müll.

Everywhere from the shore to 7 fathoms.

Circumpolar, and North-east America.

I cannot detect any difference between this species and *T. patina* of Eschscholtz, notwithstanding Middendorff's ingenious distinction as to the sculpture.

LEPETA CÆCA, Müll.

From 4 to 48 fathoms.

Circumpolar, and North-east America.

PUNCTURELLA NOACHINA, *L.*

Yamada Harbour, 7 fathoms.

Circumpolar, and North-east America. 'Porc.' exp. 66-1095 fathoms.

TROCHUS VARICOSUS, *Mighels & Adams.*

= *Margarita elegantissima*, *Bean.*

= *M. plicata*, *Sars.*

= *M. polaris*, *Danielssen.*

A single specimen from 48 fathoms.

Spitzbergen (*Torell*); Gaspé Bay, Gulf of St. Lawrence (*Whiteaves*); New Brunswick, Newfoundland, and Nova Scotia (*Mighels & Adams*, *Willis*, and *Stimpson*); Norway (*Sars*, *Koren*, and *Danielssen*). Fossil in the Bridlington Glacial bed (*Bean*).

LACUNA DIVARICATA, *Fabr.*; var. ECANICULATA.

A single specimen from 7 fathoms.

Northern Europe, Asia, and America. The absence of a canal is also noticeable in every other British species of *Lacuna*.

LITTORINA RUDIS, *Maton.*

A single dead specimen from 7 fathoms, probably carried out by the tide or voided by a fish.

North Atlantic, Mediterranean, and North Pacific.

MENESTHO ALBULA, *Fabr.*

Several specimens.

Spitzbergen and Greenland.

NATICA AFFINIS, *Gm.*

= *N. clausa*, *Broderip & Sowerby.*

Three specimens.

North of Europe, Asia, and America. 'Porc.' exp. 203-664 fathoms.

N. GRÆNLANDICA, *Ch.*

Endermo; Yeso, 3 fathoms.

Same range as last species. 'Porc.' exp. 173-725 fathoms.

ADMETE VIRIDULA, *Fabr.*

A single specimen from 48 fathoms.

Spitzbergen (*Torell*); Norway, Greenland, and N.E. America. 'Porc.' exp. 114-420 fathoms.

PURPURA LAPILLUS, *L.*

Shore to 4 fathoms.

North Atlantic, Mediterranean, and North Pacific.

MUREX ERINACEUS, *L.*; var. *FAUCE PURPUREA*.

A single specimen from 7 fathoms.

North-east Atlantic and Mediterranean. The same variety is found in Jersey.

TROPHON CLATHRATUS, *L.*; var. *GUNNERI*.

Several specimens from 3 to 48 fathoms.

Circumpolar and North-east America. 'Porc.' exp. 155-345 fathoms.

NASSA RETICULATA, *L.*

A single specimen from 6 fathoms.

North Atlantic, Mediterranean, and Black Sea.

RINGICULA AURICULATA, *Menard*.

A single specimen from 5 fathoms.

North Atlantic, Mediterranean, and Gulf of Suez. 'Porc.' exp. 15-128 fathoms.

PLEUROTOMA TURRICULA, *Montagu*.

Two young specimens from 48 fathoms.

North Atlantic. 'Porc.' exp. 10-994 fathoms.

P. MITRULA, *Lovén*.

A single specimen from 7 fathoms.

Norwegian.

P. RENIERI, *Scacchi*.

One specimen from Matoza Harbour, in N. lat. 34° 23', E. long. 136° 55'. It differs only in the apex being more elongated.

Bay of Biscay and Mediterranean, in 45-539 fathoms.

CYLICHNA ALBA, *Brown*.

= *C. corticata*, *Möll*.

Two specimens.

Circumpolar, North Atlantic and North Pacific. 'Porc.' exp. 114-1366 fathoms.

British Museum, 7/5/73.

MY DEAR SIR,—I enclose the list of fishes found in the Mediterranean (including Madeira) and in Japan. I have also made a column for such of the species as occur in the West Indies. The list might have been much increased by looking carefully through more recent records. The species included in it are either pelagic or deep-sea species (that is, species having naturally a

very wide range); and most of those enumerated occur also in other parts of the Atlantic, Indian, and Pacific Oceans. Some of them, like *Serranus octocinctus*, *Centriscus gracilis*, *Lophotes*, have hitherto not been found in intermediate regions.

It is a fact known for a long time that a great number of the pelagic species spawn in the open sea, which will go far to account for their wide geographical range.

Can I be of further assistance to you ?

Yours very truly,

A. GÜNTHER.

J. Gwyn Jeffreys, Esq., F.R.S.

	Mediterranean or Madeiran.	West Indies.	Japan.
<i>Anthias oculatus</i>	*	*	*
<i>Serranus octocinctus</i> .....	.....	*	*
<i>Scomber pneumatophorus</i> .....	*	.....	*
<i>Echeneis remora</i>	*	*	*
— <i>brachyptera</i>	*	*	*
— <i>naucrates</i>	*	*	*
<i>Caranx hippos</i> .....	.....	*	*
<i>Seriola dumerilii</i> .....	*	.....	*
— <i>lalandii</i>	*	*	*
<i>Centriscus gracilis</i> .....	*	.....	*
<i>Lophotes</i> .....	*	.....	*
<i>Macrurus</i> .....	*	.....	*
<i>Saurus myops</i> .....	.....	*	*
<i>Albula conorhynchus</i>	*	*	*
<i>Elops saurus</i> .....	.....	*	*
<i>Conger vulgaris</i>	*	*	*
<i>Myrus</i> .....	*	.....	*
<i>Hippocampus antiquorum</i> .....	*	.....	*
— <i>guttulatus</i> .....	.....	*	*
<i>Monacanthus setifer</i>	*	*	*
— <i>monoceros</i> .....	.....	*	*
<i>Orthogoriscus mola</i> .....	*	.....	*
<i>Galeocerdo tigrinus</i> .....	.....	*	*
<i>Zygæna malleus</i>	*	*	*
<i>Lamna cornubica</i>	*	*	*
<i>Rhina squatina</i> .....	*	.....	*
<i>Rhinobatus columnæ</i> .....	*	.....	*
<i>Trygon pastinaca</i>	*	*	*
<i>Pteroplatea hirundo</i> .....	*	.....	*
	22	18	29

Zoological Department, British Museum,

December 17, 1873.

MY DEAR SIR,—I return the list of species of marine fishes common to the North Atlantic and Japan. In Ichthyology the

affinity of these two districts has been ascertained for a long time; and it would become still more apparent if regard had been had not only to species (some of which have a very wide range) but also to genera—and, secondly, if the marine fauna of Western North America had been drawn within your present researches.

Of course you are aware that a large proportion of the terrestrial animals of Northern Japan are European types.

I remain, yours very truly

A. GÜNTHER.

J. Gwyn Jeffreys, Esq., F.R.S.

Note on a New Species of Japanese Brachiopoda. By THOMAS DAVIDSON. Communicated by J. GWYN JEFFREYS, Esq., LL.D., F.R.S., F.L.S.

[Read January 15, 1874.]

IN the Proceedings of the Zoological Society of London for April 1871, I described and illustrated all the species of Brachiopoda (twenty in number) that had been procured from the Japanese waters.

Since then Dr. C. E. Lischke obtained from the Bay of Jedo several examples of a coppery-coloured and green *Lingula*, approaching in size and character to *Lingula smaragdina*, Adams, a species common to the China sea, and which will before long be described in that naturalist's work 'Japoniacks Musei Conchilica.'

In 1872 Captain St. John, of Her Majesty's Ship 'Sylvia,' dredged five or six species of Brachiopoda in North Japan, namely:—*Terebratella Coreanica*, Adams & Reeves, 48 fathoms; *T. frontalis*, Middendorff, 35 fathoms; *Laqueus rubella*, Sow., 35 fathoms; *Waldheimia Grayii*, Dav., and its var. *transversa*, 35 fathoms; *Rhynchonella psittacea*, Gmelin, 35 fathoms.

We are therefore indebted to Captain St. John for the knowledge of one additional species in the Japanese waters, viz. *Terebratella frontalis*, Middendorff; and it is interesting to add that during the year 1873 Mr. Dall has dredged several living specimens and many dead ones of his rare species at Atka Island, of the Aleutian Chain, but originally described from the Ochotsk Sea. He informs me also by letter that its range in the island